

## **ABSTRACT**

**AIM:** To compare and evaluate the antimicrobial efficacy of three herbal irrigants (Propolis, Liquorice, German chamomile) and 5% Sodium hypochlorite (NaOCl) against *Enterococcus faecalis* in the root canal .

**MATERIALS AND METHODS:** Agar- well diffusion test was done to confirm the antibacterial activity of herbal irrigants (Propolis, Liquorice and German chamomile) against *Enterococcus Faecalis*. Agar plate dilution test was used to determine the Minimum Inhibitory Concentration (MIC) of the herbal solutions. In this experimental study, 65 single-rooted maxillary central incisors were selected. The teeth were decoronated and the root canals were enlarged up to no. 15 size K- type file. After infecting the prepared canals with *Enterococcus faecalis* species, one non infected specimen was used as negative control and four groups of 16 specimens each -11 specimens for Colony forming units(CFU ), 5 specimens for Confocal laser scanning microscope (CLSM), one specimen from each group- no irrigation was done in the positive control group. During instrumentation, the root canals were irrigated with the respective solutions. The dentin debris was collected from the root canal samples and they were transferred to Aliquot tubes containing physiological saline and bacterial culture was inoculated on Mac Conkey agar and the incubation of inoculated plates were done at 37°C for 48 hours under aerobic conditions. The colony forming units were counted. For Confocal laser scanning microscope, acrylic blocks were made with the roots embedded into the acrylic resin and then apical third were cut to get transverse section and the sections were stained with SYTO 9 and Propidium iodide (PI) and the discrimination between viable (green) and dead (red) bacteria in dentinal tubules were observed. The values were recorded and subjected to statistical analysis.

**RESULTS:** 5% NaOCl and Propolis showed similar zone of inhibition followed by Liquorice and German chamomile. The minimum inhibitory concentration against *E. faecalis* for Propolis, Liquorice and German chamomile were 16.6 mg/ml, 100 mg/ml and 100 mg/ml. The colony forming units and the proportion of viable bacteria for Group I – 5% sodium hypochlorite and Group II – Propolis showed statistically significant difference ( $p < 0.05$ ) when compared to other groups.

**CONCLUSION:** 5% Sodium hypochlorite is the most effective antimicrobial agent as an endodontic irrigant but there was no statistically significant difference in the antimicrobial activity between 5% Sodium hypochlorite and Propolis. The antimicrobial activity of Liquorice and German chamomile were significantly less when compared to 5% Sodium hypochlorite and Propolis. The use of herbal alternatives as a root canal irrigant might prove to be advantageous considering the several undesirable characteristics of NaOCl.

**Keywords:** Colony forming units, Confocal laser scanning microscope, Propidium iodide, Minimum inhibitory concentration